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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte FREDERIC MALET
and ANNETT LINEMANN

Appeal 2009-003159
Application 10/690,824
Technology Center 1700

Decided: August 13, 2009

Before CHUNG K. PAK, TERRY J. OWENS, and MARK NAGUMO, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

The Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1-14, which are all of the pending claims. We have jurisdiction under 35 U.S.C. § 6(b).

The Invention

The Appellants claim a copolymer having polyamide blocks and polyether blocks. Claim 1 is illustrative:

1. A copolymer having polyamide blocks and polyether blocks, in which:

the polyether blocks essentially consist of PTMG [poly-tetramethyleneglycol] having a number-average molar mass Mn of between 200 and 4000 glmol [sic: g/mol];

the polyamide blocks are formed from a linear (noncyclic, nonbranched) aliphatic predominantly semicrystalline monomer and from a sufficient amount of at least one comonomer to reduce their crystallinity, while remaining immiscible with the polyether amorphous blocks; and

the shore D hardness is between 20 and 70, and in which the copolymer is prepared by a process comprising reacting polyamide blocks having carboxylic end groups with a polyetherdiol.

The References

Foy	4,331,786	May 25, 1982
Figuly	6,300,463 B1	Oct. 9, 2001
Montanari	6,916,517 B2	Jul. 12, 2005 (filed Jan. 25, 2002)

The Rejections

The claims stand rejected as follows: claims 1-5 and 9-14 under 35 U.S.C. § 102(b) or, in the alternative, under 35 U.S.C. § 103 over Foy; claims 1, 2, 5, and 8-14 under 35 U.S.C. § 102(b) or, in the alternative, under 35 U.S.C. § 103 over Figuly; and claims 1-14 under 35 U.S.C. § 103 over Montanari.

OPINION

We affirm the Examiner's rejections.

Rejections of claims 1-5 and 9-14 under 35 U.S.C. § 102(b) or § 103 over Foy

The Appellants separately argue only claim 5 (Br. 3). We therefore limit our discussion to that claim and to one of the other claims, i.e., claim 1, which is the sole independent claim. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2007).

Claim 1

Issue

Have the Appellants shown reversible error in the Examiner's determination that Foy discloses, or would have rendered prima facie obvious, to one of ordinary skill in the art, polyamide blocks formed from a linear aliphatic predominantly semicrystalline monomer and a sufficient amount of at least one comonomer to reduce the crystallinity of the polyamide blocks?

Findings of Fact

Foy discloses a polyether-ester-amide block copolymer (col. 1, ll. 16-28). The polyamide blocks are said to have dicarboxylic chain ends and are made by the polycondensation of a lactam, an amino-acid, or a diacid and diamine, in the presence of an excess amount of an organic diacid which has its carboxylic groups preferably at the ends of the hydrocarbon chain and which is said to serve as a chain stopper (col. 4, ll. 3-24). The diacid used to form the polyamide has 4 to 14 carbon atoms, preferably about 6 to about 12 carbon atoms, in its alkylene chain, and the diacid used as the chain stopper has 4 to 20 carbon atoms (col. 4, ll. 42-54).

Analysis

The Appellants argue that Foy's diacid is a chain-stopper rather than a comonomer, so Foy forms a polyamide block of the formula X-A-A-A-A-A-X, not X-A-B-B-A-B-A-X, where A is a monomer, B is a different monomer and X is a chain stopper (Br. 3).

Foy's disclosure that the diacid used to form the polyamide can have 4 to 14 carbon atoms and the diacid used as the chain stopper can have 4 to 20 carbons (col. 4, ll. 42-48) would have indicated to one of ordinary skill in the art that the diacid used to form the polyamide can be a different diacid than the diacid used as the chain stopper. When those diacids are different and Foy prepares the polyamide by the polycondensation of one of the diacids and a diamine in the presence of an excess of the other diacid as a chain stopper, it appears that the diamine will react with both of the diacids such that polyamide blocks having a formula such as X-A-B-B-A-B-A-X, where A is a monomer, B is a different monomer and X is a chain stopper, are formed.

As a minimum, Foy's disclosure that the diacid used to form the polyamide can differ from the diacid used as the chain stopper would have led one of ordinary skill in the art, through no more than ordinary creativity, to use different diacids, thereby resulting in polyamide blocks of a formula such as X-A-B-B-A-B-A-X being formed. *See KSR Int'l. Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (In making an obviousness determination one "can take account of the inferences and creative steps that a person of ordinary skill in the art would employ").

The reaction product of Foy's diamine and diacid used to form the polyamide can correspond to the Appellants' semicrystalline monomer

(Spec. 5:7-11). The Appellants' disclosure that the comonomer can be any comonomer and is introduced to disorganize the crystal lattice (Spec. 6:8-15) indicates that Foy's aminocarboxylic acid formed from the diamine and the excess chain stopper, which necessarily disorganizes the crystal lattice when the chain stopper diacid differs from the polyamide precursor diacid, can correspond to the Appellants' comonomer.

Also, when Foy's polyamide is made by the polycondensation of an amino acid in the presence of an excess amount of an organic diacid as a chain stopper (col. 4, ll. 6-18), the acid used to form the amino acid can have 4 to 14 carbon atoms and the chain stopper diacid can have 4 to 20 carbon atoms (col. 4, ll. 25-30, 42-48). The acid used to form the amino acid, therefore, can differ in carbon number from the chain stopper diacid. Although the chain stopper diacid is disclosed as a chain stopper, it appears that once an acid group at one end of a chain stopper diacid molecule has reacted with the amino group at the end of a growing polyamide chain to form an amide linkage, the acid group at the other end of the chain stopper diacid molecule will be available to react with the amine group of an unreacted amino acid molecule to form an amide linkage. When the chain stopper diacid differs in carbon number from the acid used to form the amino acid, the chain stopper diacid molecule which forms an amide linkage at each of its ends will disorganize the polyamide chain's crystal lattice and thereby function as the Appellants' comonomer (Spec. 6:8-15).

The Appellants have not come forward with credible evidence or chemical argument showing error in the Examiner's expectation that the reference block copolymers would have the same or similar properties

recited in claim 1 (Ans. 4-5; Office Action mailed 12-13-2006, at 3, incorporated by reference into the Final Rejection at 2, mailed 8-9-2007).

Conclusion of Law

The Appellants have not shown reversible error in the Examiner's determination that Foy discloses, or would have rendered prima facie obvious, to one of ordinary skill in the art, a copolymer having polyamide blocks formed from a linear aliphatic predominantly semicrystalline monomer and a sufficient amount of at least one comonomer to reduce the crystallinity of the polyamide blocks.

Claim 5

Issue

Have the Appellants shown reversible error in the Examiner's determination that Foy discloses, or would have rendered prima facie obvious, to one of ordinary skill in the art, a copolymer having polyamide blocks formed from a linear aliphatic predominantly semicrystalline monomer and a sufficient amount of an alpha, omega-aminocarboxylic acid comonomer to reduce the crystallinity of the polyamide blocks?

Analysis

The Appellants argue that Foy's alpha, omega aminocarboxylic acids are used in condensation resulting in a homopolymer, and are not used in conjunction with a comonomer (Br. 3).

Like the reaction product of Foy's diamine and the diacid used to form the polyamide (col. 4, ll. 3-24), the reaction product of Foy's diamine and excess chain stopper diacid is an alpha, omega-aminocarboxylic acid. When the chain stopper diacid differs from the polyamide precursor diacid, the alpha, omega aminocarboxylic acid formed from the diamine and the

excess chain stopper diacid differs from the alpha, omega aminocarboxylic acid formed from the diamine and the polyamide precursor diacid. The alpha, omega aminocarboxylic acid formed from the diamine and the polyamide precursor diacid corresponds to the Appellants linear aliphatic predominantly semicrystalline monomer, and the alpha, omega aminocarboxylic acid formed from the diamine and the excess chain stopper diacid corresponds to the Appellants' alpha, omega aminocarboxylic acid comonomer (Spec. 6:12-13).

Conclusion of Law

The Appellants have not shown reversible error in the Examiner's determination that Foy discloses, or would have rendered prima facie obvious, to one of ordinary skill in the art, polyamide blocks formed from a linear aliphatic predominantly semicrystalline monomer and a sufficient amount of an alpha, omega-aminocarboxylic acid comonomer to reduce the crystallinity of the polyamide blocks.

Rejections of claims 1, 2, 5, and 8-14 under 35 U.S.C. § 102(b) or § 103 over Figuly

Issue

Have the Appellants shown reversible error in the Examiner's determination that Figuly discloses, or would have rendered prima facie obvious, to one of ordinary skill in the art, polyamide blocks formed from a linear aliphatic predominantly semicrystalline monomer and a sufficient amount of at least one comonomer to reduce the crystallinity of the polyamide blocks?

Findings of Fact

Figuly discloses thermoplastic elastomeric polymers containing polyether blocks and polyamide blocks (col. 1, ll. 8-13). The polyamide blocks are formed from an aminocarboxylic acid in the presence of a dicarboxylic acid chain stopper (col. 6, ll. 54-55; col. 7, ll. 44-45). The exemplified chain stopper diacids differ in carbon number from the acids used to form the amino acids (col. 6, ll. 54-55; col. 7, ll. 44-45).

Analysis

The Appellants argue that Figuly's dicarboxylic acid function as a chain stopper, not as a comonomer with the aminocarboxylic acid (Br. 4).

As discussed above regarding the rejection over Foy, it appears that because the chain stopper diacid differs in carbon number from the acid used to form the amino acid, the chain stopper diacid can function as the Appellants' comonomer by forming amide linkages at each of its ends and thereby disorganizing the polyamide's crystal lattice.

Conclusion of Law

The Appellants have not shown reversible error in the Examiner's determination that Figuly discloses, or would have rendered prima facie obvious, to one of ordinary skill in the art, polyamide blocks formed from a linear aliphatic predominantly semicrystalline monomer and a sufficient amount of at least one comonomer to reduce the crystallinity of the polyamide blocks.

Rejection of claims 1-14 under
35 U.S.C. § 103 over Montanari

Issue

Have the Appellants shown reversible error in the Examiner's determination that Montanari would have rendered prima facie obvious, to one of ordinary skill in the art, a copolymer having polyamide blocks formed from a linear aliphatic predominantly semicrystalline monomer and a sufficient amount of at least one comonomer to reduce the crystallinity of the polyamide blocks yet maintain the immiscibility of the polyamide blocks with polyether amorphous blocks?

Findings of Fact

Montanari discloses a copolymer having polyamide blocks and polyether blocks and a Shore D hardness of 20 to 75, advantageously 30 to 70 (col. 6, ll. 39-55; col. 7, ll. 9-14). The polyamide blocks can be the condensation product "of one or more α,ω-aminocarboxylic acids and/or of one or more lactams containing from 6 to 12 carbon atoms in the presence of a dicarboxylic acid containing from 4 to 12 carbon atoms" (col. 7, ll. 46-50). The polyamide blocks also can be the condensation product "of at least one α,ω-aminocarboxylic acid (or a lactam), at least one diamine and at least one dicarboxylic acid" (col. 7, l. 66 – col. 8, l. 2). The polyether blocks advantageously are polypropylene glycol (PPG) or polytetramethylene glycol (PTMG) blocks (col. 8, ll. 33-34). Exemplified PTMG blocks have number-average molar masses of 650 and 1,000 (col. 10, ll. 36, 40).

Analysis

The Appellants argue that Montanari does not suggest polyether blocks which essentially consist of PTMG (Br. 4).

Montanari's disclosure that "PPG or PTMG blocks are advantageously used" (col. 8, ll. 34-35) and Montanari's use of PTMG blocks in examples (col. 10, ll. 36, 40) would have indicated to one of ordinary skill in the art that the polyether blocks can essentially consist of PTMG.

The Appellants argue that Montanari does not suggest polyamide blocks made of a predominantly semicrystalline monomer with a sufficient amount of comonomer to reduce the crystallinity of the polyamide blocks while remaining immiscible with the polyether blocks (Br. 4-5)

When Montanari's polyamide blocks are the condensation product of one or more α,ω-aminocarboxylic acids and one or more lactams in the presence of a dicarboxylic acid (col. 7, ll. 46-50), the α,ω-aminocarboxylic acid corresponds to the Appellants' linear aliphatic predominantly semicrystalline monomer, the lactam corresponds to the Appellants' comonomer, and the dicarboxylic acid corresponds to the Appellants' chain stopper. When Montanari's polyamide blocks are the condensation product of at least one α,ω-aminocarboxylic acid or lactam, at least one diamine, and at least one dicarboxylic acid (col. 7, l. 67 – col. 8, l. 2), the α,ω-aminocarboxylic acid corresponds to the Appellants' linear aliphatic predominantly semicrystalline monomer, the diamine corresponds to the Appellants' comonomer, and the dicarboxylic acid corresponds to the Appellants' chain stopper.

The Appellants disclose that their comonomer is present in a low enough amount to maintain sufficient crystallinity for there to be phase separation between the polyamide blocks and polyether blocks, thereby making it possible to maintain good mechanical properties (Spec. 6:8-11).

Montanari's disclosure of preparing the polyamide blocks from combinations of an α,ω-aminocarboxylic acid and a lactam (corresponding to the Appellants' comonomer), or an α,ω-aminocarboxylic acid and a diamine (corresponding to the Appellants' comonomer) (col.7, ll. 46-49; col. 7, l. 67 – col. 8, l. 2), would have indicated to one of ordinary skill in the art that any amount of lactam or diamine that produces a product having the desired properties is suitable. Because Montanari's final product is to have good mechanical properties (col. 4, ll. 13-14), it appears that one of ordinary skill in the art would have used amounts of lactam or diamine that result in polyamide blocks which contribute to those properties in the final composition, i.e., amounts which maintain the immiscibility of the polyamide blocks and the polyether blocks and thereby contribute to good mechanical properties.

The Appellants argue that Montanari does not suggest a copolymer having polyamide blocks and polyether blocks and a Shore D hardness of 20 to 70 (Br. 5).

Montanari discloses that the copolymer having polyamide blocks and polyether blocks has a Shore D hardness of 20 to 75, advantageously 30 to 70 (col. 7, ll. 9-14).

The Appellants argue that Montanari does not suggest reacting polyamide blocks having carboxylic end groups with a polyether diol (Br. 5).

Montanari discloses reacting polyether diol blocks with polyamide blocks having carboxylic end groups (col. 7, ll. 18-20).

The Appellants argue that Montanari does not indicate that the copolymer having polyamide blocks and polyether blocks is transparent (Br. 5).

That argument is not well taken because it is directed toward a limitation which is not in the claims. *See In re Self*, 671 F.2d 1344, 1348 (CCPA 1982). Regardless, Montanari's disclosure that the copolymer having polyamide blocks and polyether blocks makes possible the use of a smaller amount of amorphous polymer B, which is transparent, appears to indicate that the copolymer having polyamide blocks and polyether blocks is transparent (col. 1, l. 54; col. 9, ll. 5-7).

Conclusion of Law

The Appellants have not shown reversible error in the Examiner's determination that Montanari would have rendered prima facie obvious, to one of ordinary skill in the art, polyamide blocks formed from a linear aliphatic predominantly semicrystalline monomer and a sufficient amount of at least one comonomer to reduce the crystallinity of the polyamide blocks yet maintain the immiscibility of the polyamide blocks with polyether amorphous blocks.

DECISION/ORDER

The rejections of claims 1-5 and 9-14 under 35 U.S.C. § 102(b) or, in the alternative, under 35 U.S.C. § 103 over Foy, and claims 1-14 under 35 U.S.C. § 103 over Montanari are affirmed. The rejections of claims 1, 2, 5, and 8-14 under 35 U.S.C. § 102(b) or, in the alternative, under 35 U.S.C. § 103 over Figuly are reversed.

It is ordered that the Examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

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